

THE MOSSES OF THE NORTHERN TERRITORY, AUSTRALIA

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Summary

The total number of species of mosses now definitely known to occur in the Northern Territory of Australia is 95. Of these 54 have not been reported previously, 7 are confirmed and 15 are new records for the Australian flora, including two new species (*Fissidens darwinianus* and *F. gillianus*); 7 previously reported were based on errors of identification; 6 others remain doubtful, no collections having been seen. Collections representative of distribution and presence in different herbaria are cited.

Introduction

It was long supposed that the moss flora of the Northern Territory was very meagre. Thus F. von Mueller (Mitten 1883, p.93) noted *Fissidens victorialis* Mitt. as "One of the only three mosses seen by me in North-west Australia in 1855 and 1856" while spending eleven months in the Northern Territory with 'A.C. Gregory's expedition'. Later (Mueller 1864) he wrote "The whole of tropical Australia with the exception of its eastern wet forest mountains, is almost totally devoid of mosses". Likewise Specht, with the National Geographic Society cum Smithsonian Institution Expedition to Arnhem Land in 1948, collected only one moss, a sterile *Archidium*. However, recent expeditions have uncovered a fair number of species, especially in the tropical north and the mountains of the southern area. We are particularly indebted to the following for the privilege of studying their collections: Mr L.A. Craven (CANB), Mr P.K. Latz (Conservation Commission of the Northern Territory), Dr G. Leach, Mr G. Wightman (DNA), Mr R. Filson (MEL), Mr H. Streimann (CBG), Mr A.C. Beauglehole, whose extensive collections are in MEL and to Mr J. Russell-Smith, whose collections are in CANB and DNA.

Some remarkable absences may be noted. No Polytrichaceae have been found in N.T., a lack also in W.A., and the weedy *Ceratodon purpureus* also appears to be absent. Even more surprising is the great rarity of *Gigaspermum repens*, which is found in Kimberley in W.A. and as far north as Millstream Falls in Queensland. The following is a record of present knowledge, including reports which are dubious. In the case of species for which numerous collections have been made, only a few are cited, sufficient to indicate the range of distribution and disposition in different herbaria. Herbarium D.G.C. will eventually be deposited in AD; I.G. Stone specimens in MEL or MELU. Previous published records were by F. von Mueller in Mitten (1883), J.H. Willis (1955, 1957 and 1958), G.A.M. Scott & I.G. Stone (1976), I.G. Stone (1979, 1982 and 1985) and D.G. Catcheside (1980). Species not included for N.T. in these publications, are indicated by an asterisk (*); those previously doubtful and now confirmed are indicated by a dagger (†); deletions are shown by #. Occurrence in other States is noted.

Archidiaceae

Archidium rothii Watts ex Roth: Mount Olga Gorge, *D.G. Catcheside* 76.310, 8.ix.1976; same locality, *I.G. Stone* 5150 (Stone 1982); Harts Range, *P.G. Martin* 1052, vii.1953 (Herb. D.G.C.); Kings Canyon, *I.G. Stone* 5158, 15.vi.1977; Katherine Gorge, *I.G. Stone* 23309 p.p., 12.vi.1985 (MELU). Also in Qld and W.A.

Other species of *Archidium*, apparently always sterile (without capsules), are evidently widely distributed and common in the Northern Territory (Stone 1982). They are perennial, often binding soil to form solid mats, especially on shady banks and in the beds of streams between rocks and the roots of trees where they are watered intermittently. The consistent absence of sporophytes is surprising in view of the fact that all species are said to be monoicous. It may be that some species have lost the capacity to reproduce sexually and depend on vegetative reproduction by means of detached branches, tips of leaves or other fragments which are readily spread by water or wind. It is difficult to be sure of their correct names, but there appear to be two or three species, one or two related to *A. indicum* and *A. birmannicum* and the other to *A. ohioense*. These names are used tentatively. They are similar superficially and all in the section *Protobium* C. Müll. of the subgenus *Archidium*. The following key, adapted from the monograph by Snider (1975), may serve to distinguish the species.

1. Median cells of upper stems and perichaetial leaves usually irregular in shape, from quadrate to shortly rectangular, trapezoid or rhomboidal in one leaf; alar cells quadrate to shortly rectangular, only slightly smaller than the median cells, not conspicuously differentiated. Section *Phascoidea* (*A. stellatum*, *A. clavatum*)
 Median cells of upper stem and perichaetial leaves usually uniform, rhombic hexagonal to elongately or linearly rhomboidal or rectangular; if areolation irregular, the alar cells quadrate, smaller than the inner cells, in 2-8 rows extending 4-15 cells up the margin. Section *Protobium* 2
2. Costa of upper stem leaves strongly excurrent, usually forming a hair point, sometimes broken off 3
 Costa of upper stem leaves subpercurrent to shortly excurrent, rarely forming a hair point 4
3. Leaves ovate to rounded ovate lanceolate, the apex abruptly shortly acuminate to form a hair point; median cells of upper leaves uniformly shortly rectangular to elongately hexagonal, mostly less than 40 μm long; perichaetial leaves less than 1 mm long, ovate to oblong, costa faint, percurrent to shortly excurrent *A. rothii*
 Leaves narrower, ovate lanceolate to narrowly lanceolate or elongately triangular, the apex gradually acuminate to a hair point; median cells elongately rhomboidal, variable in length, mostly more than 40 μm long; perichaetial leaves 1-1.8 mm long, ovate to ovate lanceolate, costa strong, normally excurrent, usually with a hair point *A. ohioense*
4. Median cells of upper stem leaves mostly rectangular, only a few rhomboidal to rhombic hexagonal, 12-18 μm wide; perichaetial leaves long-lanceolate to linear lanceolate, about 8 times as long as wide *A. indicum*
 Median cells of upper stem leaves mostly rhombic hexagonal to rhomboidal or prosenchymatous, rarely rectangular, 9-14 μm wide; perichaetial leaves ovate to lanceolate, mostly 4 times as long as wide *A. birmannicum*

**A. birmannicum* Mitt. ex Dixon: Kakadu N.P., *L.A. Craven & G. Whitbread* 6791, 20.iii.1981, CANB 303359.

A. indicum Hamp. & C. Müll.: Reported by Stone (1982). Arnhem Land Expedition, *R.L. Specht* M2 and M3 (AD), originally recorded (Catcheside 1958) as perhaps *Pseudephemerum nitidum*; Kakadu N.P., *L.A. Craven & G. Whitbread* 6792, 20.iii.1981, CANB 303347; McArthur River area, on sandstone near the Clyde River, *L.A. Craven* 3522, 29.i.1976, CANB 270616; Darwin, *H. Streimann* 8768, 29.xii.1984 (CBG). Occurs also in W.A. and S.A.

A. ohioense Schimp. ex C. Müll.: Kakadu N.P., *L.A. Craven & G. Whitbread* 6571,

23.iii.1981, CANB 303388; Katherine Gorge N.P., *L.A. Craven* 6690, 6.iv.1981, CANB 303374; Bessey Spring, McArthur River Homestead, *J. Eurell* 22, 22.viii.1977, CBG 7707737; 6 km from DUPHKA College on road to Cape Arnhem, *J. and J. Eurell* 78/45, 13.viii.1978, CBG 7810567. Also in Qld (Stone 1982) and S.A.

Fissidentaceae

Fissidens asplenioides Hedw.: Doubtful. Recorded by Willis (1955) from Tallaputta (Tallipatta) Springs, about 35 km W of Haasts Bluff, NW extremity of MacDonnell Ranges, *Paul Fisch*, 29.v.1954, MEL 1022417. The specimen seen (D.G.C., 17.xii.1979) contained one stem of *F. hebetatus*, the rest being probably *Philonotis tenuis*. Occurs in W.A., S.A., Vic., Tas., N.S.W., A.C.T. and Qld.

**F. borgenii* Hampe: near Moline, *J. Russell-Smith* 114, 10.x.1981, CANB 334648. New to Australia. Also in W.A. Related to *F. humilis* Dixon & Watts, but different in the dorsal lamina ending abruptly at the base of the costa.

**F. cairnensis* Broth. & Watts: Oenpelli Road from Darwin, *G.J. Anderson* 1369 & *D.E. Symon*, 22.iv.1980. Beatrice Hill, 55 km ESE of Darwin, *H. Streimann* 8830 p.p., 3.i.1985 (CBG). Also in Qld.

F. ceylonensis Doz. & Molk. (syn. *F. subhumilis* Catcheside): George Creek, 16 km S of Adelaide River, *L. Adams* 256, 17.iii.1965, CANB 162816 (type of *F. subhumilis*), MEL 1024243 (isotype of *F. subhumilis*); Kakadu N.P. about 65 km S of Jabiru, *L.A. Craven* & *G. Whibread* 6809, 24.iii.1981, CANB 303342; Wangi Road, Walker Creek, *H. Streimann* 8807, 1.i.1985; near Moline on Oenpelli-Pine Creek Road, *J.R. Smith* 114, CANB 334648; Kakadu N.P., Baroalba Spring, *I.G. Stone* 23396, 26.vi.1985; also Nourlangie, on termite mound in *Callitris* forest, *I.G. Stone* 23386. Also in Qld and W.A.

**Fissidens darwinianus*, sp. nov.:

F. bogoriensi Fleisch. affinis, sed cellulis laminae parvioribus, ca 16-20 x 12-15 μ m. Dioicus.

Holotype: Darwin, Rapid Creek, *Victor Pedersen*, i.1965, MEL 1024242 p.p.

Paratype: Queensland, Helenvale, south of Cooktown on earth bank in shaded very wet rainforest, *I.G. Stone* 19232 p.p., 19.vi.1982 (MEL).

A member of the section *Areofissidens* C. Müll.; plants green, protonema persistent, shoots short, 1-2.5 x 1.0 mm, with up to 5 pairs of leaves. Leaves small, cultriform below, lanceolate above, reaching 1-1.4 x 0.3 mm, widest in apical lamina; margin weakly crenulate, bordered with 1-3 rows of longer, more thickly walled cells, the outer ones about 20 x 10 μ m, an inner row, often bistratose, longer and narrower, 30-60 μ m, appearing as a weak intramarginal limbidium, ceasing well below the apex; vaginant laminae barely reaching to mid-leaf, closed, the blades meeting at the margin; costa reaching apex and just excurrent; apex acute; cells lax, thinly walled, more or less hexagonal, 16-20 μ m long x 12-15 μ m wide in apical lamina, longer and oblong, to 50 x 18 μ m, at base of vaginant lamina. Dioicous. Perigonial leaves mostly unbordered, antheridia 130 μ m long, clustered at apex. Perichaetia terminal, leaves similar to vegetative. Seta 4-5 mm long, geniculate at base. Capsule inclined, asymmetrical, 0.5-0.6 mm long; exothecial cells quadrate to rectangular 25-30 μ m long x 10-20 μ m wide, longer on convex upper side, with thin bulging walls greatly thickened at the corners; peristome teeth 35-40 μ m wide at base, the rest not seen. Figs 1 and 2.

Similar to *F. bogoriensis* Fleisch. in which the plants are autoicous and the cells of the apical lamina are larger, 30-45 x 20-25 μ m, and those at base of vaginant lamina reach 80 μ m long.

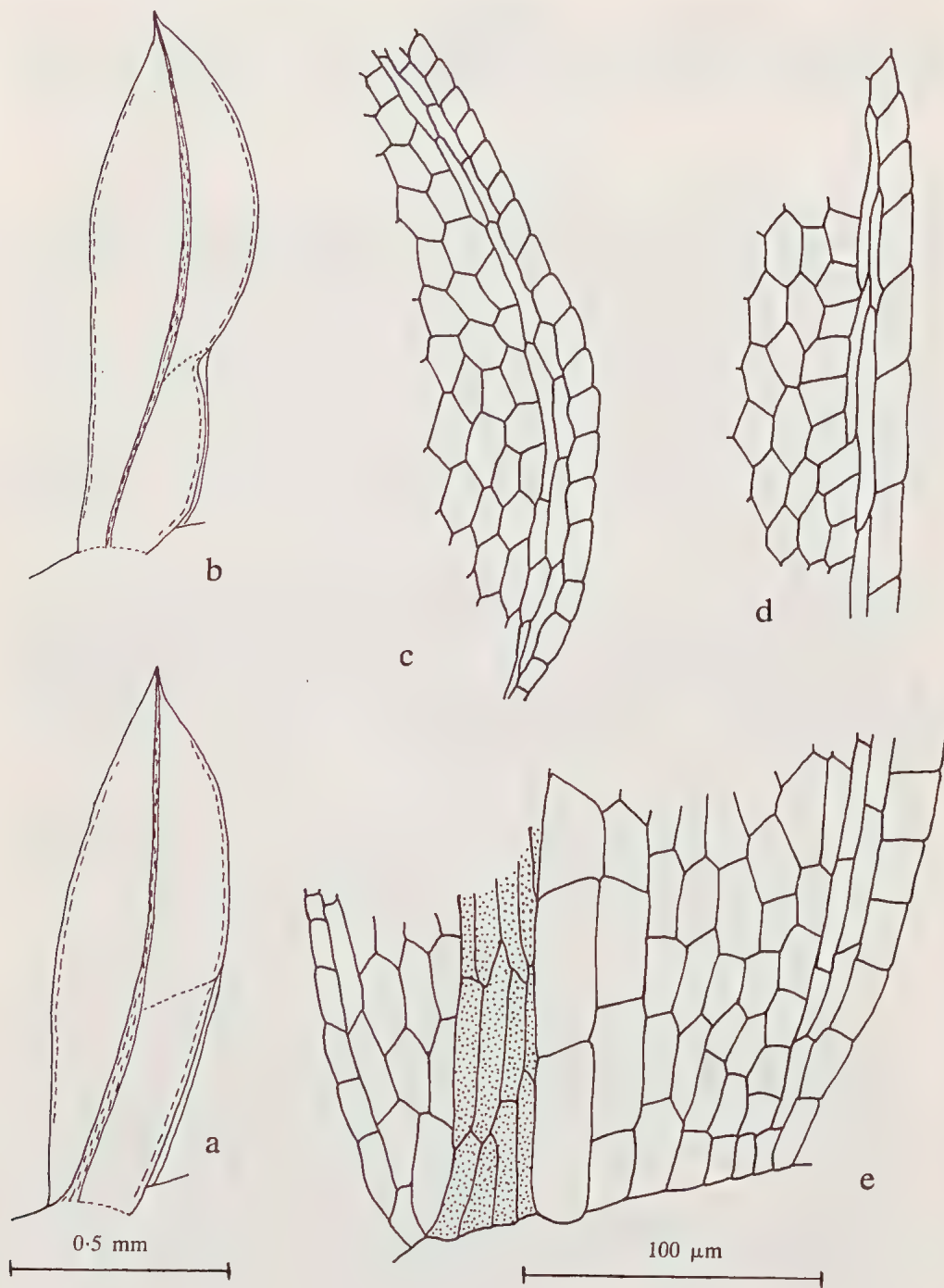


Fig. 1. *Fissidens darwinianus*: MEL 1024242 p.p.: a, b, leaves; c, adaxial margin of apical lamina; d, adaxial margin of vaginant lamina; e, base of leaf.

**F. aff. dietrichiae* C. Müll.: George Gill Range, Reedy Creek Rock Hole, *J.H. Willis*, 28.vii.1966, MEL 1022407 and 1022408; also *A.C. Beauglehole* 20937, 10.x.1966, MEL 1037897. The aquatic species related to *F. crassipes* are in need of revision. Also in N.S.W.

**F. gillianus*, sp. nov.:

F. taylorii C. Müll. affinis, sed lamina vaginans longissima, ad apicum folii fere attingens, elimbata; lamina dorsali lata superne; lamina apicali acuta; folia perichaetia intraimbata brevi indistincta; capsula suberecta; peristomii dentes divisi.

Type: Kings Canyon, George Gill Range, on shaded earth among fallen boulders below north wall of gorge, *J.H. Willis*, 29.vii.1966, MEL 1022414.

Plants small, vegetative shoots to 3.5 mm tall, 0.65 mm wide. Leaves on vegetative shoots in 18-20 pairs, increasing in size upwards to 0.5 mm x 0.2 mm wide, the lower ones with a

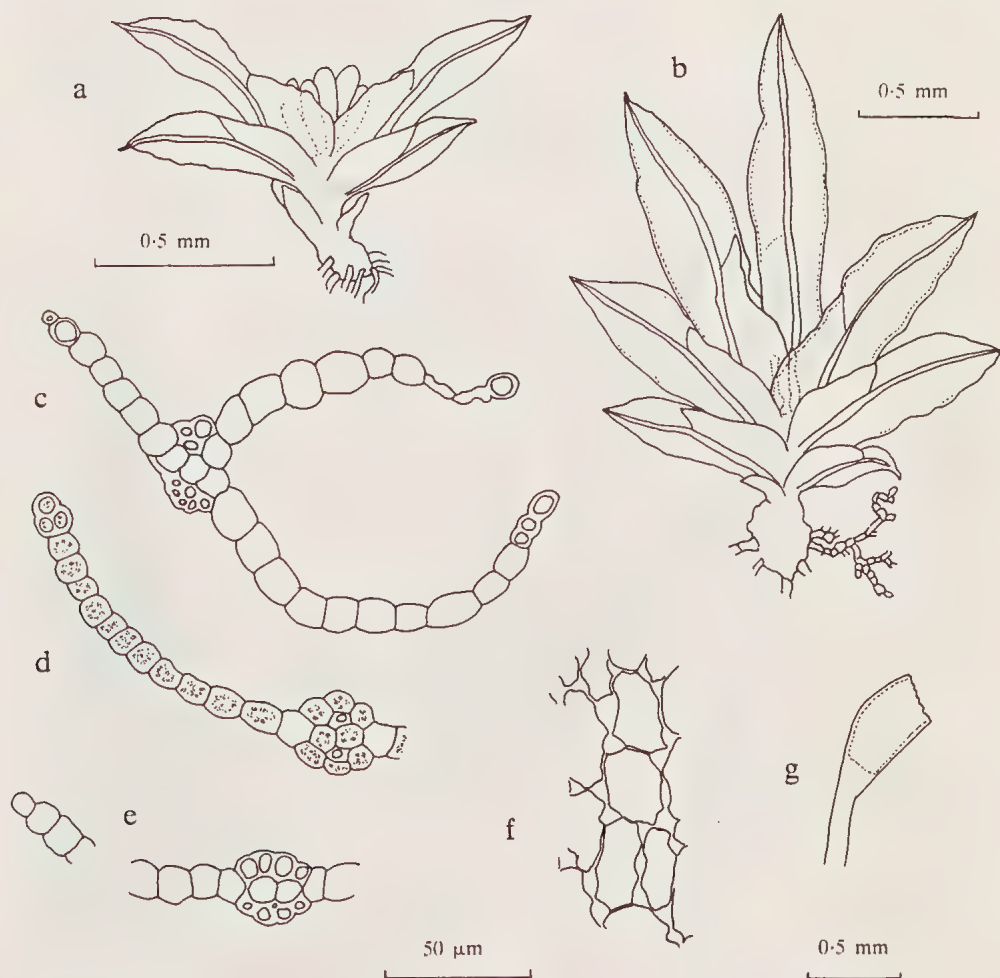


Fig. 2. *Fissidens darwinianus*: (a-e) MEL 1024242 p.p.; (f-g) *I.G. Stone* 19232 p.p.: a, male plant; b, female plant; c-e, transverse sections of leaf from base upwards; c, dorsal and vaginant laminae; d, mid-leaf with bistratose intramarginal border; e, nearer apex; f, exothecial cells; g, old capsule.

small apical lamina and narrow dorsal lamina in the upper third to half of the leaf. Upper leaves oblong, broadening above, the vaginant laminae nearly equal, occupying 0.8-0.9 of the length of the leaf, uniting near the margin, totally without a limbidium; costa sinuous, fading below the acute apex; apical lamina very short; dorsal lamina bowed outwards above, tapering below to one row of cells and ceasing above insertion. Cells smooth, mostly roughly hexagonal, the upper ones $10-15\ \mu\text{m}$ long \times $8-10\ \mu\text{m}$ wide, the lower ones larger, the marginal cells of the vaginant lamina rather wider than long and slightly protuberant to form an obscurely crenulate margin. Rhizoid gemmae small, 2-4-celled, rare. Figs 3 and 4.

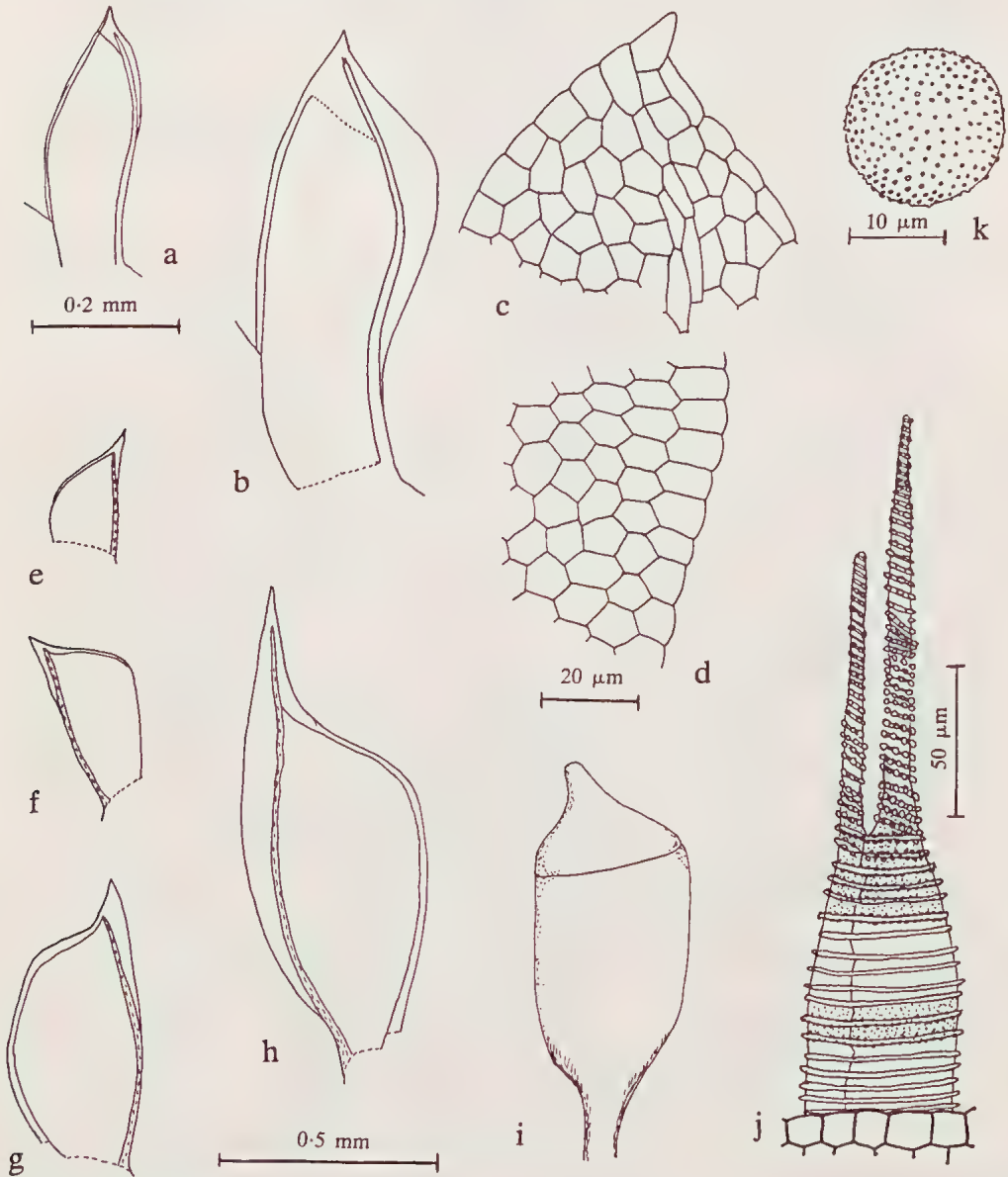


Fig. 3. *Fissidens gillianus*: MEL 1022414: a-d, vegetative shoot; a, lower leaf; b, upper leaf; c, apical cells; d, vaginant lamina cells; e-h, lower to upper perichaetial leaves; i, capsule; j, peristome tooth; k, spore.

Inflorescence variable, rhizautoicous, autoicous, possibly sometimes dioicous. Perigonia small, bud-like, sometimes axillary on vegetative shoots, sometimes at base of female plant. Perichaetia terminal on very short fertile shoot or axillary or basal on vegetative shoot; perichaetial leaves about five, the lower three small and consisting of inflated vaginant laminae, the upper two with narrow extended apical laminae. Cells similar to those of vegetative leaves, but with a short ill defined row of elongated cells intramarginally in the lower part of the vaginant lamina. Capsule short, cylindrical, nearly erect, on a seta 2.5-2.8 mm long, bent at the base; operculum rostellate. Peristome teeth 50-60 μm wide at base, divided to about halfway or rather more, the basal part with 16-18 (-20) trabeculae, the plates finely papillose between the trabeculae; the forks spirally thickened and with prominent conical papillae. Spores brown, 18-20 μm diameter, finely papillose.

This plant was labelled *F. taylorii* C. Müll., in the Melbourne herbarium, but it is distinct in leaf shape and in the absence of a limbidium in the vaginant laminae, except obscurely in the perichaetial leaves. *F. taylorii* has been used to cover a group of species, but none of the



Fig. 4. *Fissidens gillianus*: MEL 1022414: a, rhizoid gemmae; b, vegetative shoot with lateral perichaetium and capsule, calyptra loose; c, female plant with young capsule, perigonium at base; d, axillary perigonium on vegetative shoot; e, ditto, with one antheridium and one perigonial leaf (enlarged) in axil of stem leaf.

existing names fits the species described above. Other specimens of *F. gillianus* seen include: Northern Territory: Mount Conner, *J.H. Willis*, 17.vi.1974, MEL 1514426; Mount Olga, *Marie Allender*, 23.viii.1960, MEL 1022409; summit of Ayers Rock, *J.H. Willis*, 11.ix.1965, MEL 1022412; A.C.T.: Acton, *D.G. Catcheside* 68.117, 20.vii.1968; N.S.W.: Caloola Creek, 62 km NNE of Broken Hill, *H. Streimann* 6334, 28.ix.1978, CBG 7903946; W.A.: Three Mile Rocks, 37 km NNE of Bullfinch, *R. Wyatt* 4199 & *A. Stoneburner*, 7.viii.1984.

**F. gymnocarpus* Stone: Wangi Road, Finnis Range, *H. Streimann* 8792, 1.i.1985; Katherine Gorge, base of scarp, *I.G. Stone* 23301, 12.vi.1985; Kakadu N.P., road to Obiri, on mound of earth near swamp, *I.G. Stone* 23362, 23.vi.1985; Petherick's rainforest, near Woolaning, SSW of Darwin, *I.G. Stone* 23471, 3.vii.1985. Also in W.A. and Qld.

F. hebetatus Catcheside: Nourlangie Camp, S. Alligator River, *L. Adams* 303, 23.ii.1965, CANB 162836 (holotype), MEL 1024241 (isotype); Upper Katherine River, Wangi Road, Walker Creek, *H. Streimann* 8809, 1.i.1985; Slesbeek Uranium Field, *V. Pedersen*, 10.i.1955; Kakadu N.P., about 50 km W of Jabiru, *L.A. Craven* & *G. Whitbread* 6777, 19.iii.1981; Simpsons Gap, *P.G. Martin* 1036, vi.1953 (herb. D.G.C.); Kings Canyon, *J.H. Willis*, 30.vii.1966, MEL 1024250 and *D.G. Catcheside* 76.315, 10.ix.1976; Reedy Creek Rock Hole, George Gill Range, *J.H. Willis*, 28.vii.1966, MEL 1024252; SSW of Darwin, on magnetic termite mound, *I.G. Stone* 23491, 3.vii.1985. Also in W.A., N.S.W. and Qld.

F. humilis Dix. & Watts: MacDonnell Ranges, Standley Chasm, *P.G. Martin* 1087, vii.1953 (herb. D.G.C.), also *Neville Forde* 733 p.p., 10.iii.1957, MEL 1024245, and *I.G. Stone* 5154, 17.vi.1977; Chewings Range, *P.K. Latz* 6633c, 22.ix.1976 (herb. D.G.C.); George Gill Range, Kings Canyon, *H.A. Morrison*, 19.vii.1964, MEL 1024247; Kakadu N.P., about 45 km WNW of Jabiru, *L.A. Craven* and *G. Whitbread* 6781, 18.iii.1981, CANB 303352. Also Vic., N.S.W., A.C.T. and Qld.

F. leptocladus C. Müll.: Central Australia, Harts Range, Mount Riddock, *J.H. Willis*, 26.v.1974, MEL 1024239. This has relatively wider leaves than usual, approaching *F. patulifolius* Dixon, but without the cuspidate apex and somewhat larger cells of that species. In all States.

**F. perobtusius* Dixon (syn. *F. traversii* Stone): The close resemblance of *F. traversii* to *F. perobtusius* was pointed out by Dr Z. Iwatsuki (pers. comm.) who kindly sent drawings he had made of the type specimen of the latter. The two species are undoubtedly conspecific and *F. traversii* must be reduced to the synonymy of *F. perobtusius*. A specimen is in herb. BM labelled '*F. tatei*' Mitt. ined, Port Darwin, iii.1882, the collector not specified, but probably R. Tate; Jasper Gorge, near Buchanan Hwy, *J.H. Willis*, 3.vii.1974, MEL 1024237; Darwin, *H. Streimann* 8774, 29.xii.1984 (CBG); Beatrice Hill, Arnhem Hwy, 55 km SE of Darwin, *H. Streimann* 8830, 3.i.1985 (CBG); Kings Canyon, George Gill Range, *P.K. Latz*; Katherine Gorge, base of southern scarp, *I.G. Stone* 23311, 12.vi.1985, also on seepage wall, *I.G. Stone* 23325, 13.vi.1985; Kakadu N.P., Nourlangie, *I.G. Stone* 23378, 24.vi.1985. Also in Qld and W.A.

F. pungens C. Müll. & Hampe: Banks of Daly River, 90 m S of Darwin, *V. Pedersen*, 13.viii.1952, MEL 1034031. Listed by Willis (1955). The plants are rather large for *F. pungens*, but within the range of variation. In all States.

F. victorialis Mitt.: Cataract of the Victoria River, *F. von Mueller*, 1855/6, MEL 1022405 (isotype), BM (holotype); Arnhem Land, about 10 km SSE of Mt Brockman, *L.G. Adam* & *L.A. Craven* 3127, 27.ii.1973, CANB 251264; Butterfly Gorge, off Katherine Gorge, *J. Eurell*

16, 14.vii.1977, CBG 7707731; Katherine Gorge, base of southern scarp, *I.G. Stone* 23302, 12.vi.1985, also on seepage wall, *I.G. Stone*, 13.vi.1985; Kakadu N.P., Baroalba Spring, *I.G. Stone*, 26.vi.1985; also Obiri, under rock ledge, *I.G. Stone* 23339, 22.vi.1985; Oenpelli, Arnhem Land, rainforest, *I.G. Stone* 16243, 26.vii.1980. Also in W.A. and Qld.

**F. zollingeri* Mont.: Kakadu N.P. about 40 km NNE of Jabiru, *L.A. Craven & G. Whitbread* 6771, 22.iii.1981, CANB 3033394; about 35 km W of Jabiru, *L.A. Craven* 6784, 19.iii.1981, CANB 303404; Darwin, Doctors Gully, *H. Streimann* 8760, 29.xii.1984 (CBG). Also in Qld and N.S.W.

Grimmiaceae

**Grimmia laevigata* (Brid.) Brid.: Mulga Park, on rock. *A.C. Beauglehole*, 26.vi.1965, MEL 1038489; Henbury Meteor Crater, *A.C. Beauglehole*, 4.vii.1965, MEL 1037944. In all States.

Ditrichaceae

Ceratodon purpureus (Hedw.) Brid.: Scott & Stone (1976) wrote 'apparently through all parts of Australia'. Its occurrence in the N.T. is doubtful.

Eccremidium arcuatum (Hook. f. & Wils.) C. Müll.: Listed as probable by Scott & Stone (1976). Occurs in W.A., S.A., Vic., N.S.W. and Qld.

**E. minutum* (Mitt.) Stone & Scott: Ayers Rock, near base, *A.C. Beauglehole* 25885 p.p., 5.vii.1968; Manton River between Katherine & Darwin, *A.C. Beauglehole*, 20.vii.1965, MEL 1037998; George Gill Range, 2 km NE of Reedy Rock Hole, *A.C. Beauglehole*, 11.vii.1968, MEL 1038784, all as *Ephemerum whiteleggi*; Kakadu N.P., road to Obiri, on mound of earth near swamp, *I.G. Stone* 23361, 23.vi.1985. Occurs in all other States.

†*E. pulchellum* (Hook. f. & Wils.) C. Müll.: Listed as probable by Scott & Stone (1976). Summit of Ayers Rock, *P.G. Martin*, 14.vi.1953 (Herb. D.G.C.); Valley of Eagles, 52 km ENE of Alice Springs, *A.C. Beauglehole* 44965, 2.vi.1974 and Mt Olga, *Marie Allender*, 23.vii.1960, MEL 1023850, both as *Pleuridium nervosum*. Occurs in all other States.

**Garckea comosa* (Doz. & Molk.) Wijk & Marg.: Latran River, about 4 km S of Gove Airport, *J. & J. Eurell* 78/40, 16.vii.1978, CBG 7810561. Also in W.A. and Qld.

Pleuridium nervosum (Hook.) Mitt.: Listed by Scott & Stone (1976); George Gill Range, Penny Springs area, *A.C. Beauglehole*, 14.vii.1968, MEL 1037910. Also in W.A., S.A., Vic., Tas., N.S.W. and A.C.T.

Dicranaceae

**Campylopus cf. atroluteus* (C. Müll.) Par.: Kakadu N.P., about 65 km S of Jabiru, *L.A. Craven & G. Whitbread* 6811, 24.iii.1981, CANB 303348. New to Australia. This collection has been identified also as *C. comosus* (Hornsch. & Reinw.) Bosch & Lac., which occurs in Qld. However, it differs from that species in several respects, especially the absence of adaxial (ventral) stereids in the costa and the elongated rhomboidal cells in the upper lamina. It agrees well with Magill's (1981) description and with African specimens of *C. atroluteus*.

#*C. clavatus* (R.Br.) Wils.: The previous record (Catcheside 1980) was based on a mis-identification of what is *C. perauriculatus*.

**C. inchangae* (C. Müll.) Par. (syn. *C. watsii* Broth.): Kakadu N.P., 16 km SE of Koongarra, L.A. Craven 6251, 2.vi.1980, CANB 303363. Also in Qld.

C. introflexus (Hedw.) Brid.: Listed as probable by Scott & Stone (1976), but no actual specimen has been seen.

**C. perauriculatus* Broth.: Mount Giles, 23.39S. x 132.55E, P.K. Latz 6604c p.p., 19.ix.1976; Mount Giles, 23.39S x 132.50E, P.K. Latz 6623 c, 21.ix.1976, (both in herb. D.G.C.). Also in S.A., Vic., N.S.W. and Qld.

#*Pseudephemerum nitidum* (Hedw.) Reim. To be deleted, as the specimen is *Archidium indicum* (q.v.).

Leucobryaceae

**Leucobryum aduncum* Dozy & Molk.: Kakadu N.P., Craven 2487, 4.iii.1973; Oenpelli, Arnhem Land, I.G. Stone 16241, reported by Stone (1982) as possibly *L. candidum* var. *pentastichum*. New to Australia. Also in Qld. Similar to *L. scalare*, but without small quadrate cells abaxially near the base.

**L. brachyphyllum* (Hornsch.) Hampe: Oenpelli, Arnhem Land, I.G. Stone 16245, 26.vii.1980.

**L. scalare* C. Müll. ex Fleisch.: Arnhem Land, about 9 km NE of Jabiru, L.G. Adams & P. Richardson 3035, 19.ii.1973, CANB 251265; Katherine Gorge N.P., Edith Falls, L.A. Craven 6764, 8.iv.1981, CANB 303372; Kakadu N.P., Jim Jim Falls, I.G. Stone 23436, 26.vi.1985; Kakadu N.P., Baroalba Spring, I.G. Stone 23404, 26.vi.1985; Katherine Gorge, seepage wall, I.G. Stone 23317, 13.vi.1985; Melville Island, Taracumbie Falls, G. Wightman 1019, 31.i.1984 (DNA); Melville Island, Taracumbie Creek, J. Russell-Smith 1308, 9.xi.1983 (DNA). Also Qld, N.S.W. and W.A. New to Australia.

**L. stenophyllum* Besch.: Kakadu N.P., about 10 km SE of Jabiru, L.A. Craven & G. Whitbread 6803, CANB 303350. New to Australia. Also in Qld, e.g. H. Flecker 949 identified in error as *L. bowringii* var. *sericeum* (Broth.) Dixon.

#*L. teysmannianum* Dozy & Molk.: Recorded by Stone (1982). To be deleted as the specimen is *L. scalare*.

Leucobryums in the *L. candidum* complex have generally been lumped under *L. candidum* (P. Beauv.) Wils., though Thériot (1922) recognised that confusion has arisen through the presence of two species mixed in type material. The following three may be separated:

- (1) *L. candidum* (P. Beauv.) Wils.: Robust, leaves commonly in five twisting rows on the stem, secund, broadly ovate lanceolate, 5-6 x 1.2-1.5 mm, narrowly involute in the upper third, with a broad hyaline border (the lamina) in the basal part of 4-6 (average 5) rows of outer linear cells and 1-3 (average 1.9) rows of inner wide cells. Occurs in Tas., Vic., N.S.W. and Qld, in tropical and temperate rain forests.
- (2) *L. brachyphyllum* (Hornsch.) Hampe: Small, leaves short, relatively broad more or less straight, 1.7-2.4 x 0.4-0.5 mm, involute from just above base and widely so from midleaf, with a narrow hyaline border of 2-3 (average 2.5) rows of outer linear cells and 1-2 (average 1.1) rows of inner wide cells. Occurs in N.S.W. and Qld, in drier forest.

This may include *L. ballinense* Broth.

- (3) *L. aduncum* Dozy & Molk.: Intermediate in size, leaves long and narrow, 2-4 x 0.5-0.65 mm, falcate, often with an apical tuft of rhizoids, narrowly involute from just above the base, border narrow as in *L. brachyphyllum*. Occurs in Qld and N.T., in monsoon rainforest.

****Leucophanes australe* Broth.:** Kakadu N.P., about 10 km S of Jabiru, c.fr., *L.A. Craven & G. Whitbread 6806*, 25.iii.1981, CANB 33453; 'Black Jungle' 10 km E of Humpty Doo, near Darwin, *J.R. Smith 140*, 20.viii.1981, CANB 33452; Petherick's rainforest, SSW of Darwin, *I.G. Stone 23480*, 3.vii.1985. Also Qld.

***Octoblepharum albidum* Hedw.** First record F. von Mueller (Mitten 1883); Cox Peninsula, coll. R. Tate, 20.iii.1882, det. W. Mitten. Common in northern N.T. Kakadu N.P., about 65 km S of Jabiru, *L.A. Craven & G. Whitbread 6808*, 24.iii.1981, CANB 303349; Koolpin Gorge near El Sherana, SW Arnhem Land, *J.R. Smith 132*, 11.x.1981, CANB 33641; Wangi Road, Walker Creek, 68 km SSW of Darwin, *H. Streimann 8810 p.p.*, 1.i.1985 (CBG); about 11 km E of Mudginberrie Station on road to Oenpelli, *D.E. Symon*, 23.iv.1980 (Herb. D.G.C.); Robin Falls, *A.C. Beauglehole*, 23.vii.1965, MEL 13871; Petherick's rainforest, *I.G. Stone 23470*, 3.vi.1985; Katherine Gorge, on fig root at base of south facing scarp, *I.G. Stone 23308*, 12.vi.1985; Melville Island, 1 km W Snake Bay, Sandspears Jungle, *J. Russell-Smith*, 8.xi.1983 (DNA). Also in W.A. and Qld.

Calymperaceae

***Calymperes tenerum* C. Müll.:** Kakadu N.P., near Kapalga Billabong, *L.A. Craven & G. Whitbread 6817*, 18.iii.1981, CANB 303346; Darwin & Gulf District, "Kapalga" CSIRO Research Property, North Point, *H.S. Thompson 494*, 6.vi.1983, CBG 8309279; Manton Dam, *H. Streimann 8739*, 26.xii.1984 (CBG). Also in W.A. and Qld.

***C. tenerum* var. *edamense* Fleisch:** Reported by Stone (1982). The var. *edamense* Fleisch. differs from the typical species in having broader leaves, but in view of the variation in this respect, the variety is scarcely worth maintaining.

****C. erosum* C. Müll.:** Berry Springs, near Darwin, *I.G. Stone 815*, 28.viii.1967, originally recorded incorrectly (*I.G. Stone 1982*) as *C. moluccense*; near Woolanang H.S., *L.A. Craven & C.R. Dunlop 6664*, 4.iv.1981, CANB 303386; source of Barramundie Creek, *J.R. Smith 130*, 9.x.1981, CANB 334634; Kakadu, Radon Gorge, Mt Brockman, *J.R. Smith 137*, CANB 334636; Petherick's rainforest, SSW of Darwin, *I.G. Stone 23476*, 3.vii.1985. Also in Qld, recorded by Reese & Mohamed (1985).

****C. motleyi* Mitt.** in Dozy & Molk.: Manton Dam, *H. Streimann 8740 p.p.*, 26.xii.1984 (CBG); Kakadu N.P., Nourlangie, *Callitris* forest, *I.G. Stone 23388*, 25.vi.1985; Kakadu N.P., Baroalba Spring, *I.G. Stone 23399*, 26.vi.1985 Petherick's rainforest, SSW of Darwin, *I.G. Stone 23472*. Also in Qld.

****C. palisotii* Schwaegr.:** Wangi Road, Walker Creek, 68 Km SSW of Darwin, *H. Streimann 8810* (CBG). Previous record (*Stone 1982*) as *C. moluccense* Schwaegr. (a synonym) was due to misidentification; it is *C. erosum* (q.v.). Also in Qld.

****Mitthyridium flavum* (C. Müll.) Robins:** Melville Island, Jump-Up Jungle, monsoon forest, on tree, *J. Russell-Smith 1300*, 11.xi.1983, DNA 25919. Also in Qld. Reported for Australia by Reese *et al.* (1986).

**Syrrhopodon spiculosus* Hook. & Grev.: Kakadu N.P. near Anbangbang Billabong, Nourlangie Rock, *J.R. Smith* 134, 11.vi.1981, CANB 334637; source of the Barramundie Creek, S of Kakadu, *J.R. Smith* 128, 9.x.1981, CANB 334643. Although of different habit, *Smith* 134 being tall and lax, these are the same species. Katherine Gorge, on seepage wall, *I.G. Stone* 23323, 13.vi.1984; Kakadu N.P., cave at base of Barramundie Falls, *I.G. Stone* 23466, 30.vi.1985. Also in Qld. Reported for Australia by Mohamed & Reese (1985).

Pottiaceae

Acaulon crassinervium C. Müll.: Recorded by Stone (1985). Also in W.A., S.A., Vic., N.S.W. and Qld.

A. eremicola Stone. Type from Mt Olga, Stone (1979). Also in W.A. and S.A.

#*A. robustum* Broth. ex Roth.: Reported by Stone (1979) as like a papillose *A. robustum*, to be deleted as the specimen is *A. crassinervium*.

A. triquetrum (Spruce) C. Muell.: Recorded by Stone (1979). Also in all other States except Tas.

Barbula calycina Schwaegr.: Recorded by Willis (1957) from Finke River, Palm Valley, as *Tortella calycina* (Schwaegr.) Dixon. Occurs in W.A., S.A., Vic., Tas., N.S.W. and A.C.T.

**B. crinita* Schultz: The Amphitheatre, near Palm Valley, *Marie Allender*, 27.viii.1960, MEL 102240; as *B. pseudopilifera* C. Müll. & Hampe (a synonym). Occurs in W.A., S.A., Vic., Tas., N.S.W. and A.C.T.

**B. indica* (Hook.) Spreng. in Steud.: Kakadu N.P., E. Alligator River, monsoon forest, *I.G. Stone* 23344, 23.vi.1985; Berry Springs, W. of Stuart Hwy, *A.C. Beauglehole* 13849, 23.vii.1965, MEL 1038707, as *Tortella calycina* (Schwaegr.) Dix. Also in W.A. and Qld.

**B. subcalycina* C. Müll.: Trepina Gorge, *A.C. Beauglehole* 24391, 30.vii.1967, MEL 1038392. In all States.

**Bryoerythrophyllum binnsii* (R. Br. ter.) Wijk & Marg.: Kakadu N.P., E. Alligator River, *L.A. Craven* 6145B, 30.v.1980, CANB 303391. Also in W.A., S.A. and Vic.

**Crossidium davidai* Catcheside: 5 km north of Alice Springs, *A.C. Beauglehole*, 3.viii.1967, MEL 24473, as *C. geheebii*; The Olgas, *A.C. Beauglehole* 25794, 4.vii.1968, MEL 1038534, as *Tortella*; N'Dahla Gorge, E. of Alice Springs, *A.C. Beauglehole* 24429, 30.vii.1967, MEL 1038522, as *Tortula princeps*. Also S.A. and W.A.

†*Crossidium geheebii* (Broth.) Broth. Listed as probable by Scott & Stone (1976). Ochre Pits, west of Alice Springs, *A.C. Beauglehole*, 26.vii.1967, MEL 1038628. Occurs in W.A., S.A. and Vic.

Desmatodon convolutus (Brid.) Grout: Recorded by Willis (1957). Mount Conner, *P.G. Martin*, 15.vi.1953 (Herb. D.G.C.); Palm Valley, near Hermannsburg, *D.G. Catcheside* 76.321, 13.xi.1976; Kings Canyon, George Gill Range, *D.G. Catcheside* 76.313, 10.ix.1976. All States.

Didymodon torquatus (Tayl.) Catcheside. Recorded by Willis (1958) as *Barbula torquata* Tayl. Also in W.A., S.A., Vic., Tas., N.S.W. and A.C.T.

***Gymnostomum calcareum** Nees: Ormiston Gorge, *A.C. Beaglehole*, 10.vii.1975, MEL 1037965. In all States.

Gymnostomum calcareum Nees var. **longifolium** Dixon: Recorded by Willis (1955). Also in N.S.W.

Hyophila involuta (Hook.) Jaeg.: Recorded by Stone (1982). Darwin, *H. Streimann* 8734, 24.xii.1984 (CBG); Manton Dam, *H. Streimann* 8737, 26.xii.1984; Kakadu N.P., Obiri Rock, *I.G. Stone* 16236 p.p., 26.vii.1980. Also in W.A. and Qld.

***H. rosea** Williams: Kakadu N.P., Kuna, *H.S. Thompson* 390, v.1983. Also in W.A.

***Pottia brevicaulis** (Tayl.) C. Müll.: Standley Chasm, *A.C. Beaglehole* 27614, 27.vii.1968, MEL 1037565; The Olgas, *A.C. Beaglehole* 22951, 30.vi.1967, MEL 1037702, both as *Weissia willisiana* Sainsbury. Also in W.A., S.A., Vic. and N.S.W.

P. latzii Catcheside: Mount Giles, *P.K. Latz* 6604d, 19.ix.1976 (Herb. D.G.C., type).

Pottia scabrifolia Bartram: *P.K. Latz* 5639c, (Herb. D.G.C.). Also in W.A. and S.A.

Tetrapterum cylindricum (Tayl.) Jaeg.: Queried by Scott & Stone (1976) as doubtful. Occurs in W.A., S.A., Vic., Tas., N.S.W. and Qld.

***Tortula pagorum** (Milde) De Not: Standley Chasm: *A.C. Beaglehole* 23663, 13.vii.1967, MEL 1038679, King's Canyon, George Gill Range, *A.C. Beaglehole* 23193, 5.vii.1967, MEL 1038687; Ayers Rock, *A.C. Beaglehole* 25874, 5.vii.1968, MEL 1038580, all as *Tortula princeps*; Ooraminna Rock Hole, 40 km S of Alice Springs, *A.C. Beaglehole* 27720, MEL 1038341. Also in W.A., S.A., Vic. and N.S.W.

***Trichostomum brachydontium** Bruch: Standley Chasm, *D.G. Catcheside* 76.319, 12.ix.1976; Palm Valley, near Hermannsburg, *D.G. Catcheside* 76.320, 13.ix.1976; Palm Valley, *J.H. Willis s.n.*, 16.ix.1965 (MEL 1023855); George Gill Range, Kings Canyon, *A.C. Beaglehole* 26472, 10.vii.1968 (MEL 1038478). New to Australia. Also in S.A. (as *T. species A*, see Catcheside 1980), N.S.W. and Qld.

***T. crispulum** Bruch: Amphitheatre near Palm Valley, near Hermannsburg, *Winifred M. Curtis*, .viii.1954 (MEL 1023874), also *Marie Allender*, 27.viii.1960, (MEL 1022439) as *B. pseudopilifera* C. Müll & Hampe; Hanns Range, S. of Aileron, *A.C. Beaglehole* 24499, 3.viii.1967 (MEL 1038561). New to Australia.

All Australian specimens of these two species of *Trichostomum* are sterile, but are vegetatively like exotic specimens, certainly within the range of variation.

Weissia willisiana (Sainsbury) Catcheside: Type (as *Pottia willisiana*) from Standley Chasm, MacDonnell Ranges.

Funariaceae

#**Funaria apophysata** (Tayl.) Broth.: Recorded by Willis (1957), but deleted by Willis (1958) as being a mixture of "*F. glabra*" and *F. gracilis*.

#**F. gracilis** (Hook. f. & Wils.) Broth.: Recorded by Willis (1958), but both collections are *F. helmsii* Broth. & Geh. according to Willis (1964, in litt.).

F. helmsii Broth. & Geh.: Ross River area, on bank of Bitter Springs River, *D.G. Catcheside* 76.329 p.p., 16.ix.1976; Chewing Range, *P.K. Latz* 6604b, 19.ix.1976 (Herb. D.G.C.); Mount Olga, *P.G. Martin* 1099, vi.1953 (Herb. D.G.C.), also *I.G. Stone* 5131, 13.vi.1977. Also in W.A., S.A. Vic. and N.S.W.

F. hygrometrica Hedw.: Willis (1957). Finke River, coll. *H. Kempe*, 1882, det. F. von Mueller, MEL 1023867. Alice Springs, *P.K. Latz* & *D.G. Catcheside* 76.324, ix.1976; Mount Giles, *P.K. Latz* 6614b p.p., 20.ix.1976 (Herb. D.G.C.). In all States.

F. muhlenbergii Turn. (syn. *F. glabra* Tayl.): bank of Bitter Springs River, E. of Alice Springs, *D.G. Catcheside* 76.329, 16.ix.1976; Valley of Eagles, *A.C. Beauglehole* 20944, ix.1966, MEL 1037518 as *F. glabra*. Formerly recorded as *F. glabra*. Occurs in W.A., S.A., Vic., N.S.W. and A.C.T.

***F. radians** Hedw. (syn. *F. acaulis* Hampe.): Ormiston Gorge, *A.C. Beauglehole* 13724, 10.vii.1965, MEL 1037968; George Gill Range, Reedy Creek Rock Hole, *A.C. Beauglehole* 20938, 10.x.1967, MEL 1037890; Serpentine Gorge, *A.C. Beauglehole* 24320, 27.vii.1967, MEL 1038775, all as *F. glabra*. New to Australia. Occurs in W.A., S.A., Vic., N.S.W. and A.C.T.

***F. subnuda** Tayl.: Chewing Range, 23.42S x 133.19E, *P.K. Latz* s.n., 26.v.1977, in herb. *I.G. Stone* 5098. Also in W.A. and S.A.

Goniomitrium acuminatum Hook. f. & Wils.: Alice Springs, *H.A. Morrison*, 17.vi.1974, MEL 1024235; Serpentine Gorge, on rock above waterline, *I.G. Stone* 814, 20.viii.1968; Olga Gorge, on earth near spring, *I.G. Stone* 5133, 13.vi.1977; Standley Chasm, *D.G. Catcheside* 76.316, 12.ix.1976; Palm Valley, *A.C. Beauglehole*, 27.vii.1968. Also in W.A., S.A., Vic., N.S.W., A.C.T. and Qld.

***G. enerve** Hook. f. & Wils.: near Kunoth Well, *D. Nelson* 2307, 15.viii.1973 (NT). Also W.A., S.A., Vic. and A.C.T.

Gigaspermaceae

***Gigaspermum repens** (Hook.) Lindb.: Ayers Rock, at base, *A.C. Beauglehole*, 5.vii.1968, MEL 1038365 p.p.; Palm Valley, *A.C. Beauglehole*, 24.vii.1968, MEL 1038501; George Gill Range, Wallaby Gorge area, *A.C. Beauglehole*, 11.vii.1968, MEL 103851. In all States.

Ephemeraceae

Ephemerum cristatum Hook. f. & Hook. f. & Wils.: Stone (1982); Ayers Rock, *A.C. Beauglehole*, 29.vi.1967, MEL 1037691. Also in W.A., S.A., Vic., Tas., N.S.W. and Qld.

Splachnobryaceae

***Gymnostomiella vernicosa** (Hook.) Fleisch.: Cape Beach on Cape Arnhem, S of Gove, *J. & J. Eurell* 78/39, 15.vii.1978, CBG 7810560. Also in Qld (Stone 1985).

Splachnobryum baileyi Broth.: Stone (1982). Also in Qld.

***S. indicum** Hampe & C. Müll.: Darwin, Fannie Bay, *H. Streimann* 8829, 3.i.1985 (CBG). New to Australia.

**S. geheebii* Fleisch.: Kakadu N.P., E. Alligator River, monsoon forest, *I.G. Stone* 23343, 23.vi.1985. The cells are smaller than in *S. oorschotti* (Lac.) C. Müll. but the toothing of the margin matches that species. New to Australia.

The following key may serve to distinguish the species in northern Australia:

1. Leaves concave, margin narrowly recurved from base to mid-leaf usually on one side; costa to ca 40 μm wide and 4 cells deep, begleiter cells present 2
 Leaves concave to flat, sometimes sinuous to undulate; margin not recurved; costa weaker to 20 μm wide and shallower, with no begleiter cells 3
2. Cells mostly 15-18 μm wide, margin mostly entire *S. baileyi*
 Cells smaller, 8-10 μm wide, margin crenulate at apex *S. indicum*
3. Apex rounded or obtuse, not recurved 4
 Apex of leaf often recurved, sometimes with a throat-like constriction, cells 10-12 μm wide *S. wiemansii*
4. Margin toothed above, cells about 15 μm wide *S. oorschotti*
 Margin deeply crenulate above, cells smaller, 9-12 μm wide *S. geheebii*

Bryaceae

Brachymenium exile (Dozy & Molke.) Bosch & Lac.: Streimann & Touw (1981).

B. preissianum (Hampe) Jaeg.: F. von Mueller (Mitten 1883); with *Funaria hygrometrica*, Finke River, *H. Kempe*, 1882, MEL 1023867. In all States.

Bryum argenteum Hedw.: Willis (1957). Top of Ayers Rock, *P.G. Martin* 1127c, 14.vi.1953; Mount Conner, *P.G. Martin*, 15.vi.1953 (Herb. D.G.C.); Mount Olga Gorge, *D.G. Catcheside* 76.311, 8.ix.1976; also *I.G. Stone* 5140, 13.vi.1977, George Gill Range, Kings Canyon, *A.C. Beauglehole*, 2.vii.1965, MEL 1037546. In all States.

B. caespitium Hedw.: Kakadu N.P., *L.A. Craven* 6145A, 30.v.1980, CANB 303390. Also S.A., Vic., Tas. and A.C.T.

B. capillare Hedw.: Mount Giles, *P.K. Latz* 6614b p.p., 20.ix.1976 (Herb. D.G.C.). In W.A., S.A., Tas., N.S.W. and A.C.T.

B. dichotomum Hedw.: Alice Springs, *P.K. Latz* & *D.G. Catcheside* 76.326, 15.ix.1976; Mount Giles, *P.K. Latz* 6623b p.p., 21.ix.1976; top of Ayers Rock, *P.G. Martin* 1102, 12.vi.1953; Standley Chasm, *D.G. Catcheside* 76.318, 12.ix.1976; Mt Conner, *J.H. Willis*, 17.vi.1974, MEL 1039543. In all States.

B. pachytheca C. Müll.: *J.H. Willis* (1957). There is some uncertainty about the identity of this material. In all States.

B. radiculosum Brid.: Mount Giles, *P.K. Latz* 6614b p.p., 20.ix.1976 (Herb. D.G.C.).

**Leptobryum pyriforme* (Hedw.) Wils.: Arid Zone Research Institute, Alice Springs, *P.K. Latz* 5639d, 19.vii.1974. Also S.A., Vic., Tas. and N.S.W.

**Pohlia wahlenbergii* (Web. & Mohr.) Andrews: Darwin, *H. Streimann* 8773, 29.xii.1984. In Tas, Vic., N.S.W. and A.C.T.

Bartramiaceae

Philonotis tenuis (Tayl.) Reichdt.: Willis (1955); George Gill Range, Reedy Rock Hole, above fall, *A.C. Beauglehole*, 10.x.1966, MEL 1037898. In all States.

***P. hastata** (Dub.) Wijk & Marg.: Katherine Gorge N.P., Edith Falls, *J. Eurell* 4, 19.vi.1977, CBG 7707719. Also Qld.

Erpodiaceae

***Erpodium australiense** Stone: Abandoned silver mine near Moline, *J.R. Smith* 115, 10.x.1981, CANB 334650; E side of S Alligator River, near Jabiru Bridge, *J.R. Smith* 117, 23.ix.1981, CANB 334667 (with *Calymperes tenerum*). Also W.A. and Qld.

E. biseriatum (Aust.) Aust.: Recorded by Stone (1985). Although superficially like the Australian endemic *Wildia solmsiellacea* C. Müll. & Broth., it differs vegetatively in the papillae on the leaf cells being simple or only slightly compound. *Wildia* has larger, C-shaped papillae. Nourlangie Rock, Kakadu, *J. Russell-Smith* 106, CANB 334663, has no sporophytes. Distribution highly disjunct.

Entodontaceae

***Trachyphyllum inflexum** (Harv.) Gepp: Widely spread in Kakadu N.P. in rainforest; near Kapalga Billabong, *L.A. Craven & G. Whitbread* 6824, 18.iii.1981, CANB 334672; Koolpin Gorge, *J.R. Smith* 133, CANB 3346531; Kakadu N.P., near Nourlangie Safari Camp, *M. Lazarides & L. Adams* 302, 23.iii.1965, CANB and MEL 1519433; Petherick's rainforest, SSW of Darwin, *I.G. Stone* 23481, 3.vi.1985. Also in W.A. and Qld.

Sematophyllaceae

***Sematophyllum caespitosum** (Hedw.) Mitt.: Kakadu N.P., 6.5 km SE of Jim Jim Falls, *L.A. Craven* 5809, CANB 303379; Katherine Gorge N.P., Edith Falls, *L.A. Craven* 6763, 8.iv.1981, CANB 303373; Nourlangie Creek, *J. Heaton*, x.1959, ex herb. J.H. Willis as *Isopterygium*. Also Qld.

Taxithelium nepalense Fleisch.: Stone (1982). Petherick's rainforest, SSW of Darwin, *I.G. Stone* 23485 p.p., 3.vii.1985. Also in Qld.

***T. instratum** (Brid.) Broth.: "Black Jungle", 10 km E of Humpty Doo, *J.R. Smith* 139, 20.viii.1981, CANB 334649. Also Qld.

***T. kerianum** (Broth.) Fleisch.: Berry Springs, 30 km SE of Darwin, *H. Streimann* 8833, 3.i.1985 (CBG). Also Qld.

***Wijkia** sp.: Kakadu N.P., Nourlangie Rock, *J.R. Smith* 110, 30.ix.1981, CANB 334668. This may be *W. hornschurchii* (Dozy & Molk.) Crum, but the points of the leaves are rather short. If it is this species, it is new to Australia.

Hypnaceae

***Isopterygium minutirameum** (C. Müll.) Jaeg.: Kakadu N.P., about 10 km SE of Jabiru, *L.A. Craven & G. Whitbread* 6801, 25.iii.1981, CANB 303354; Kakadu N.P., Nourlangie Rock, *J.R. Smith* 108, 28.ix.1981, CANB 334670; Radon Gorge, Mt Brockman, *J. Russell-Smith* 138 p.p., 10.vii.1981, CANB 334635. Also N.S.W. and Qld.

***Isopterygium* sp.:** Wangi Road, Walker Creek, 68 km SSW of Darwin, *H. Streimann 8814*, (CBG); Emerald River, Groote Eylandt, *D.H. Ashton s.n.*, 19.v.1979 (MELU).

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References

- Brotherus, V.F. (1924). Die Natürlichen Pflanzenfamilien. Teil 1, Bd 10. (Engelmann: Leipzig).
- Catcheside, D.G. (1958). In R.L. Specht and C.P. Mountford (eds). Records of the American-Australian Scientific Expedition to Arnhem Land, Vol. 3, p. 169.
- Catcheside, D.G. (1980). Mosses of South Australia. (Govt Printer: Adelaide).
- Fleischer, M. (1904). Die Musci der Flora von Buitenzorg 1. (E.J. Brill: Leiden).
- Magill, R.E. (1981). Flora of Southern Africa: Bryophyta, Part 1, Mosses, Fascicle 1. (Republic of South Africa).
- Mitten, W. (1883). Australian Mosses. *Trans. Proc. Roy. Soc. Victoria* 19: 49-96.
- Mohamed, H. & Reese, W.D. (1985). *Syrrhopodon* (Musci: Calymperaceae) in Malaysia and adjacent regions. *The Bryologist* 88: 223-254.
- Mueller, F. von (1864). Analytical Drawings of Australian Mosses. (Govt Printer: Melbourne).
- Mueller, F. von (1880). Fragmenta Phytographiae Australiae. Vol. 11, Supplement 3. (Govt Printer: Melbourne).
- Reese, W.D. & Mohamed, H. (1985). A synopsis of *Calymperes* (Musci: Calymperaceae) in Malaysia and adjacent regions. *The Bryologist* 88: 98-109.
- Reese, W.D. & Mohamed, H. & Mohamed, A.D. (1986). A synopsis of *Mitthyridium* (Musci: Calymperaceae) in Malaysia and adjacent regions. *The Bryologist* 89: 49-58.
- Scott, G.A.M. & Stone, I.G. (1976). The Mosses of Southern Australia. (Academic Press: London, New York, San Francisco).
- Snider, J.A. (1975). A revision of the genus *Archidium* (Musci). *Jl Hattori bot. Lab.* 39: 105-201.
- Stone, I.G. (1979). *Acaulon eremicola*, a new moss from the Australian arid zone. *Jl Bryol.* 10: 467-474.
- Stone, I.G. (1982). Some new and noteworthy records of mosses mostly from Queensland, Australia. *Austrobaileya* 1: 511-520.
- Stone, I.G. (1985). New records of mosses in Australia. *Jl Bryol.* 13: 475-478.
- Streimann, H. & Touw, A. (1981). New records for some Australian mosses. *Jl Hattori bot. Lab.* 39: 105-201.
- Thériot, I. (1922). Le problème du *Leucobryum candidum*. *Bull. Soc. Bot. Genève Ser 2*, 13: 217-225.
- Willis, J.H. (1955). New and interesting moss records for Australia. *Victorian Naturalist* 72: 73-78.
- Willis, J.H. (1957). New records of mosses for Australian States. *Victorian Naturalist* 74: 101-105.
- Willis, J.H. (1958). Additional notes on Northern Territory Mosses. *Victorian Naturalist* 75: 189.